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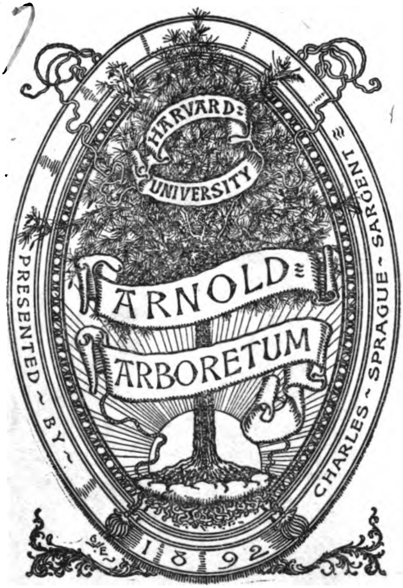

HARVARD UNIVERSITY
ARNOLD ARBORETUM
PRESENTED BY CHARLES SPRAGUE SARGENT
1892

AN

EASTER HOLIDAY

IN

LIGURIA:

WITH AN ACCOUNT OF THE GARDEN OF THE PALAZZO ORENGO AT MORTOLA.

BY

PROFESSOR FLÜCKIGER, OF STRASSBURG.

1877.

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ARBORETUM
HARVARD

May 1908
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AN

EASTER HOLIDAY IN LIGURIA.*

BY PROFESSOR FLÜCKIGER, UNIVERSITY OF STRASSBURG.

THE strip of land that extends round the Gulf of Genoa from Spezzia to Nice, is rightly called simply "The Shore" (*Riviera*). Where else is there such a diversified abundance of landscape beauty poured out? Perhaps the double gulf of Naples and Salerno outvies the Riviera in grandeur, but not in loveliness of form of mountain and coast, or in the variety and fulness of its flora. Not till four degrees further south does the plant-world again find itself under equally favourable conditions for the unfolding of the southern character that so much attracts the Northerner, and doubly charms him if privileged to shelter himself upon that sunny coast from the wild storms of winter.

By the end of March, or beginning of April, the umbrageous westerly and south-westerly portions of the Lombardy plains are already rejoicing in a fresh if not a varied green, whence in a very short time the sea may be reached by the Turin and Savona road. The Ligurian Alps are still covered with snow, and from ravines and valleys turbid streams rush southward, and, conducted through widely ramified artificial channels, "Béaï" or "canali," fill numberless reservoirs, "peschiere" or "pille," from which in summer time the olive and lemon gardens are refreshed. The snow covering becomes thinner and thinner; the bare chestnuts and miserable pines are replaced by olive thickets and the glossy foliage of the *agrumi*, where fragrant lemons, mandarins, and oranges make their appearance in thousands. Savona is more than superficially connected with these, for a burgher of that pleasant city, Giorgio Gallesio, cannot remain unmentioned when speaking of our botanical knowledge of those noble economic plants, since he contributed to it a still valuable book, "Traité du Citrus" (Paris, 1811); besides his splendid "Pomona Italiana" (Pisa, 1817–1834). Gallesio rightly traced back their numerous cultured varieties to the few principal species of *Citrus;* for instance, in his opinion the bergamot is a hybrid between the orange and the lemon. According to him, also, lemons and citrons were cultivated in Savona in the middle of the fifteenth century. Belgrano ("Vita privata dei Genovesi, Genova" 1875, p. 158) however alludes to the planting of twelve "citroniorum," A.D. 1369, in the garden of a palace at Genoa. And as to Sicily, agrumi were no doubt introduced there at a much earlier period by the Arabs. Aranci and cedri are mentioned as growing in the tenth century near Palermo ("Amari, Storia dei Musulmani di Sicilia" ii., 1858, p. 445; iii. 787). And Vincentius Bellovacensis, a Dominican monk of Beauvais in the French Département de l'Oise, in the middle of the thirteenth century, points out, in his "Speculum naturæ," that the juice of "limonum vel pomorum citrinorum," termed "melangoli vel arangii," is a good solvent for many substances: no doubt in allusion to the citric acid it contains.

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* Translated from *Buchner's Repertorium für Pharmacie*, vol. xxv. (München, 1876), pp. 449-505, with additional notes of the author. I have to thank Messrs. Winter and Rütschi, the owners of a well-known flourishing Stabilimento d'orticoltura at Bordighera, for many competent contributions to this paper.

Charming as is the country of Savona, the beauty of the coast-line and the mountains westward increases considerably. The stages between San Remo and Bordighera to Nice may be described as the most magnificent portion of the whole Riviera; and if one single point is to be preferred, it is the district of Monaco. But it would be a fastidious undertaking to attempt to separate the most beautiful from the perfectly lovely. In respect to climate, however, a sharp boundary can be drawn. The mildest portion is the strip between Ventimiglia and Beaulieu, or Villafranca, in which, near Monaco and Mentone, landscape beauty and softness attain their most complete expression. Only rarely are a few snow-flakes seen at Mentone, and the number of days on which rain falls (not rainy days) is about sixty; but at Nice it is at least eighty. These figures illustrate clearly the considerable difference between Mentone and Nice. At Nice the sheltering mountains recede, the background is more open, and the outlook extends to the lofty summits of the Maritime Alps; the district is therefore more accessible to wind and weather.

Between Ventimiglia and Villafranca the country is level only where the rivers have broken their banks and left deposits of detritus. The mountains consist of hard Jurassic limestone, soft marly deposits, and much distorted strata of crumbling nummulitic limestone, presenting a sufficiently large surface to the action of water to form excavations, which sometimes recall —as in the Val di Latte—the famous "Karrenfelder" of the Alps, and impart to the coast a wild craggy formation. The principal action of the water probably occurred far back in prehistoric times, and it stands out in striking contrast to the present poverty of water in the district.

As in many southern lands, so also in the Riviera, the heights put off their forest adornments for the longest time; only isolated patches of pine, consisting mostly of weakly trees, are to be seen on the upper mountain slopes. Somewhat denser and more stately clumps here and there adorn the shady sides of the more craggy valleys, which are not suited to cultivation. The magnificent *Pinus Pinea,* L., is absent from the western half of the coast, the Riviera di Ponente; on the eastern half, the Riviera di Levante, as at Sestri, beautiful groups of this species occur; but not until considerably farther south, as at Viareggio, near Pisa, is there an opportunity of admiring its full effect as a forest tree. By far the most prevailing conifer in the Riviera is the *Pinus halepensis,* Mill., much less picturesque than the mighty *Pinus Pinea,* though always affording a beautiful prospect, from the light green of its soft, thin, outspreading tufts of leaves. *Pinus halepensis* is greatly injured by the people of this country, inasmuch as they frequently deprive it of its leaves in order to use them instead of straw in their stables. Even the smallest trees bear comparatively numerous cones, which are at first very slender and acutely conical, but after the falling out of the seed, through shrinking, come to look shortened and rounded, and remain on the weather-beaten trees. They are always sharply recurved, the scales broad and not pointed. This maritime pine is distinguished from other species by its less rigid growth; the stems and branches often assume the most fantastic contortions from the direction given to the south-west wind by rocky angles exposed to it. *Pinus Pinaster*, Solander, generally known under the name of *Pinus maritima*, Poiret, occurring more isolated in the Riviera di Ponente, is of more regular growth and rigid appearance, to which the stiff divergent leaves, three millimetres thick and twenty-five centimetres long, especially contribute. In no part of the country do these coniferæ occur in such number or of such size as to favour their use in the production of resin or turpentine.

The northern juniper is in these sunny climes replaced by the far more handsome *Juniperus Oxycedrus*, L. Its somewhat broader and shorter leaves do not differ very much from those of the *Juniperus communis*, but from the greater prominence of the white bands on the under side they produce a different impression. Moreover, the much more plentifully developed ramifications of this tree do not tend upwards, but form dense rounded tops of vigorous appearance; consequently it differs essentially from the compact pyramidal growth of the *Juniperus communis*, as shown most exquisitely by this tree in Norway (see Schübeler, Pflanzenwelt Norwegens, Christiania, 1875, pp. 143, 145). The berries of *J. Oxycedrus* attain a size of seventeen millimetres by fifteen millimetres, but are sometimes much smaller; they are red-brown when ripe, and usually proceed from three carpels, like those of *J. communis.* Göppert, in 1871, has described a variety of the latter as *J. duplicata,* in which two whorls of three leaves grow adherent to the fruit. This condition occurs frequently in the cones of *J. Oxycedrus*, and the grey-blue hoary sutures of the carpels contrast strongly with the brown epidermis. The fruit encloses only three seeds, which, as in *J. communis,* are provided on the sides and back with hollow resin vessels. Opinions may differ as to the delicacy of the smell, but it is undeniable that this southern conifer is much less aromatic than its northern relative. The epicarp is also tougher, and the light yellow fleshy portion of the fruit is drier and coarsely fibrous. The undoubtedly smaller proportion of essential oil present in the berries of *J. Oxycedrus* allows their sweetness to become more manifest, although they may contain less sugar. The contents of the resin ducts are nearly solid and tasteless, and consist just as little as in *J. communis* of volatile oil. The reply to an oft-repeated inquiry whether the juniper or its berries were in any way used in this district, was always positively negative. Although the Pharmacopœa Germanica derives its oleum juniperi empyreumaticum (oil of cade) from the wood of *Juniperus Oxycedrus*, it cannot, at any rate, be drawn from the Riviera, and it is probable that it is not prepared commonly anywhere else.

The mastic tree (*Pistacia Lentiscus*, L.) in this district no longer merits the name of tree, since it forms as a mere bush the chief constituent of the underwood, and its glossy evergreen leaves cling to the dryest rocks. One exception is the magnificent mastic tree of the Villa Giribaldi, in Bordighera, probably one of the largest specimens at present in existence; for throughout the Mediterranean region the scarcity of fuel has pressed hardly upon this tree. The mastic tree in the above garden stands upon a rather elevated spot; the ground is heaped up round about the stem, so that only the strong boughs, bare underneath, are visible; these are much branched, and form a beautiful leafy shade, about ten metres in diameter. The smooth branches are prettily bent, and form an elegant tuft, adorned, even on the 8th of April, with racemes of male flowers. From the slow growth of this species an age of many decades (or, as thought by competent men, even several centuries), may be ascribed to the Bordighera tree. Even the owner was not exactly informed upon the subject, but is well aware of the interest attached to his remarkable tree. In Chios, which island is famed for mastic resin, many of these trees were killed in 1850 by frost; the tree at Bordighera, although standing in a position by no means particularly sheltered, remained uninjured, which is a striking illustration of the mildness of this strip of coast.

A very usual companion of the mastic bush is the myrtle (*Myrtus communis*, L.), the ornamental flowers of which do not appear until late in summer. At present the plant has not a specially cheerful look, as it only bears a few shrivelled berries, and the evergreen leaves present no fresh colour at the commencement of April. A somewhat less massive but not quite dissimilar form of bush appears in the slender *Daphne Gnidium*, L., the flowering time of which is already past. Its bark is used in Italy and France, like that of *Daphne Mezereum* in the North. Both plants are distinguished, amongst other characteristics, by a very remarkable growth. *D. Gnidium* occurs frequently with a stem more than a metre long; at the end only of which are a number of nearly whorled compressed branchlets; the leathery leaves are arranged at wide intervals nearly all over the stem. Gnidium bark is therefore easily recognized by the arrangement of its leaf scars, and moreover it is never so broad as Mezereum bark, since the stems seldom exceed a centimetre in diameter, which in the knotty *Daphne Mezereum* is frequently the case.

Buxus sempervirens, L., is entirely absent from the coast, but grows beautifully in the cool well-watered valleys. Thorns and prickles prosper in this country better than in the north. In this respect the *Smilax aspera*, L., is guarded in a prominent manner, and is of unparalleled importunity, being a disagreeable weed throughout all the Mediterranean. On the rocks it forms, in conjunction with the procumbent *Asparagus acutifolius*, with its prickly leaves and stems, a dangerous thicket, but an *Oxycedrus juniper* ensnared and overgrown by *Smilax* is unapproachable. It costs considerable trouble to obtain for the herbarium good specimens in which the tough tendrils, the elegant drooping bunches of red-black insipid berries, and the many-shaped leaves can be shown uninjured. More difficult still is it to obtain the root-stock, which does not resemble sarsaparilla. The part above ground, however, does so very much, recalling the *Smilax officinalis*, as it may be seen at Kew, and giving a very good idea of the appearance of the sarsaparilla plants. Of course the leaves of *S. aspera* are much smaller; but in good soil and rather moist spots they attain a diameter of ten centimetres, and a length of twelve centimetres, and might very well then be compared with the leaves of the said South American species, the obtusely cordate outline of which they completely share. *Smilax aspera* possesses a tolerably elongated woody root-stock, devoid of roots corresponding with the officinal Radix Sarsaparillæ. It has not been demonstrated whether these root-stocks contain the same frothing substance (parillin, smilacin) as is present in sarsaparilla. A decoction of them is used in skin diseases by the people of Malta. "Radix Sarsaparillæ, Smilacis asperæ Peruvianæ," which occurs in the German medicine tariffs of the seventeenth century, as, for instance, in that of Nordhausen (1657), shows that already this similarity had been noticed. It is more remarkable perhaps ~~to find~~ in a Nuremberg tariff of 1652, " Baccæ Smilacis asperæ." This plant, in respect to the number and form of its leaves, stalks and runners, shows as many variations as our blackberry, and would be favourable to the setting-up of a good number of species or varieties. The variety mauritanica has been distinguished as being devoid of prickles.

Smilax forms the most formidable bulwark of thornbush when it is combined with *Calycotome spinosa*, Link (or *Cytisus spinosus*, Lamk., *Spartium spinosum*, L.), and *Sp. junceum*. The golden blossoms of these two even now adorn the uncultivated slopes and crags, just as in England and South Germany they are covered at Easter by the nearly allied Broom, *Sarothamnus scoparius*, Koch. (*S. vulgaris*, Wimmer). The representative of the elastic pliable stems of the latter are in the *Spartium spinosum* shorter and more woody, and hence more offensively rigid.

Beautiful as are the above-mentioned Papilionaceæ, and some other bushes of the same family that also make their appearance at this time, they are far excelled by the perhaps less plentiful *Euphorbia dendroides*, L., an indescribably elegant bush when in full bloom. All the northern euphorbias, even the *Euphorbia palustris*, have only a simple herbaceous stalk; but the stem of this species, which at the base is some centimetres thick, is quite woody, and rises in most elegant three-forked branches to a most beautiful light umbel, at the height of a man. The bark and the herbaceous portions are full of milky juice, and it would not be difficult to collect it in sufficient quantity for comparison with the medicinal euphorbium. In the summer all this magnificence is dried up and withered, and the arid branches of the *Euphorbia dendroides* then no longer attract notice. The people of the Riviera formerly used to intoxicate the fishes by throwing this plant in the water. The same abuse is stated by Heldreich to be practised in Greece, especially in sweet water. The Greeks use for that purpose both the Euphorbia dendroides and E. Wulfenii, Hoppe.

Among the indigenous shrubs the *Coriaria myrtifolia,* L., also takes a prominent position. Its long and generally bowed and nodding stems, are usually almost devoid of leaves at the end of March, but in the first days of April the succulent light green leaflets and unshowy blossoms shoot forth very rapidly into luxuriant fulness. The crystallisable bitter principle of this plant (coriamyrtin) possesses poisonous properties, recalling to some extent those of picrotoxin, the active principle of Cocculus indicus. Coriaria blends the form of the bramble, as *Smilax* and *Rubus,* with the marked rigidity of *Spartium.* In dry and less sheltered places, instead of Coriaria, the elegant *Globularia Alypum,* L., is the prevailing shrub; it much resembles the closely-allied species of Globularia, which are met with in the sunny slopes throughout the alpine countries, but the Mediterranean plant is much stronger. The name of Alypum alludes to the medicinal virtues which, with little reason, were formerly attributed to it.

On the banks of torrents *Nerium Oleander,* the well-known ornamental plant of cold houses throughout temperate Europe, abounds. In this country, if a little protected against dryness, it forms extremely handsome and stately bushes, affording either simple or double flowers, varying from the usual rose or purple hue to pure white. The willows of northern Europe are replaced by *Vitex Agnus castus,* the smaller branches of which may be used for the same purposes as the shoots of our willows. Agnus castus is frequently mentioned by the classical authors; it is common also throughout Greece, but always in moist places.

Among the vegetation of shady damp places, which are not very numerous in this part of the Riviera, some smaller plants may be pointed out on account of their elegance, viz., the maiden-hair, *Adiantum Capillus Veneris*, and *Asplenium Trichomanes*, two ferns extending as far north as the southern coasts of Ireland and England. The same is to be said with regard to *Viola odorata* and *Vinca acutiflora*, the latter, however, being replaced in northern countries by the similar species Vinca minor. Then again the modest little *Selaginella denticulata*, and lastly, as one of the taller inhabitants of shady valleys, there is vigorously growing the common ivy, *Hedera Helix*. But as to ivy trees and ivy-clad rocks and walls, England is no doubt superior to the south.

The most generally diffused shrub is *Rosmarinus officinalis*, L., which is everywhere distributed in abundance from the coast to the hilltops. The rosemary has peculiar claims to be considered a most distinguishing plant of the western Mediterranean countries, as it is not even wanting in the Sahara. The Northerner notices with interest the carefully-protected and poetically-celebrated acquaintance of his native land here growing luxuriantly and in perfect riot, as vigorous underwood, to a height of 1½ metres. Nevertheless the woody stems of the rosemary are neither truly erect nor truly bent, the flowers are neither blue nor white, the leaves are neither grey nor green; in short, it is difficult to point out in this plant features particularly noteworthy to the eye, but it was held in high esteem from ancient times, and possesses also chemical interest. ~~The solid por~~tion (stearoptene) of rosemary oil appears ~~to~~ consist of two varieties of camphor ~~rotating polarised light~~ in opposite directions.

Rosemary cannot be mentioned without the thoughts reverting to *Thymus vulgaris*, which on this coast occupies a similar place, although not so conspicuous on account of its small size, it only attaining a height of about four decimetres. But thyme is a much more spreading plant, its knotted stems are singularly bent; from the dull grey of the leaves the beautiful reddish flowers stand out brightly; and the aroma of the little shrub is as peculiar as it is powerful. The name *Rosmarinus* is indicative of the preference of this plant for the immediate neighbourhood of the coast; *Thymus vulgaris*, on the other hand, rises in this, as in the Aragon districts, to an elevation of upwards of 1,000 metres in the mountain regions, and makes a most lovely appearance in the valleys of the Maritime Alps, where the rosemary no longer occurs, although in the Balearic Isles it attains an elevation of 1,300 feet. With this is connected the greater power of resistance possessed by the thyme. The far more vigorous rosemary cannot endure the Northern winter, at least not in the larger part of England; but the little thyme is not even injured by the winter of Christiania, and as an annual garden plant flourishes at a latitude of 65° to 70° in Sweden, in Iceland, on the mild Norwegian coast even at 70°, and at the other extreme in Morocco. So extremely differently do these two labiates behave that in the Riviera they grow in the closest association, yet singularly enough they are almost entirely wanting in Greece. The insignificant thyme remain~~ed a strang~~er to the Romans and in the Middle Ages, whilst the rosemary was distinguished in many places in Latin literature as a popular plant, and was also esteemed by the Arabs. This explains how Charlemagne, in the year 812, in the *Capitulare*, included "ros marinum" in the interesting list of South European economic plants, the cultivation of which he ordered to be attempted on the northern side of the Alps, but did not include thyme, which probably first obtained its position as an aromatic kitchen herb since the Middle Ages.

With the thymol generated by the chemical activity of the *Thymus vulgaris* money might be made, as it possesses antiseptic properties similar to those of other allied substances like carbolic acid. But nobody thinks of such a thing here; nowhere throughout the Riviera is the distillation of essential oils energetically carried on with the exception of Mentone. In the Val di Latte, near Ventimiglia, rosemary, lavender, and thyme are occasionally distilled in a very crude fashion, but in inconsiderable quantities; the production of oils at Nervi, in the Riviera di Levante, being equally insignificant.

Lavandula vera, DC. (*Lavandula officinalis*, Chaix, *L. angustifolia*, Mönch.), has in March and April only withered leaves and flower stalks to show. It is much less frequent and does not occur so plentifully as rosemary and thyme. *Lavandula* shuns proximity to the sea, and appears chiefly above the olive region, at an altitude of 200 or 300 metres; it cannot therefore be taken into consideration in picturing the spring vegetation of the Riviera.

Besides the plants already mentioned, the shore is mainly enlivened by the *Zostera*, the ligulate leaves and strong rhizomes of which tossed upon the beach by the breakers become there bleached and weather-beaten. Further, there are the two Cruciferæ, *Moricandia arvensis* DC., and *Crambe maritima;* also *Crithmum maritimum*, L., *Thelygonum Cynocrambe*, L., several species of Euphorbia, *Statice* and *Atriplex*, the *Galactites tomentosa* with white besprinkled leaves, and another thistle, the yellow-flowered Cardo santo, *Cnicus benedictus*, to which may be associated the beautiful *Lavatera maritima* and *Obione portulacoides*. Of Algæ there are not many to be found here; the larger fucoids especially are wanting.

But the plant which above all other determines the appearance of the entire country is the olive tree (*Olea europæa*, L.). At this time of the year its fresh young blossoms begin to unfold; its thick evergreen leaves cover the landscape with their solemn grey, which accords so well with the cloudless sky, the bare mountain tops, and the blue-green sea. The cheerful light green of northern more delicately foliaged trees would be far less suitable than these mighty trunks, endowed with such tenacious power of life, which lift on high their far extending branches. It is in such a landscape as this, especially in the lower valleys, that the olive tree must be seen to be properly valued. Neither age nor injury from axe or from storm appears to be capable of extinguishing its vital forces. So long as the trunk exists it sends out its knotted branches, or emits shoots from its wide extending roots which with wonderful power insinuate themselves into the wildest rocks as soon as they bear the slightest covering of fertile soil. In fact, the olive trees of the Riviera have attained a size that is not met with again in Central Italy, but only in the south, as at Sorrento. The pleasant semi-shadow of the olive groves calls to memory the northern fruit gardens, or the dense foliage of the English forests, the peculiar charms of each only gaining by the comparison. Where the ground is too steep and bare, the industrious Italian cultivates terrace above terrace in order to provide space for the olive, vine and fig tree. These artificially graded walls (*muricciuoli*) allow the most favourable development of the peculiarities of the olive tree. The planting of the olive is easy, as every one of the numerous spreading rootlets has the power of development. The *Olea europœa* may take quite another form, or, rather, revert to its original form; the trunks and boughs grow straight; the leaves remain shorter; and the branches run out into thorny points. These degenerated bushes, *Olea oleaster*, are improved by grafting. For the completion of the picture is wanted the oil mill, which is always constructed in the simplest fashion, and so placed that at the proper time the requisite quantity of water can be conducted to its overshot wheel; for which cause the number of these mills is rather limited. They do not serve as dwelling-places, but contain only the two millstones (frontoio) and the rude screw press. The crushed fruit is packed into sacks, and yields first the finest and thinnest oil; the press residues are then worked with hot water to obtain the inferior oil. "Fex olei seu amurca, Baumölhefen," mentioned in a Frankfort tariff of 1612, referred to such a very impure oil, which in olden times found many applications, as noticed by Cato, Marcus Terentius, Varro, and Pliny. In front of the larger oil mills are to be seen a number of open quadrangular receptacles, constructed of rude masonry, which serve to hold the residues from the first or second pressings, belonging to different proprietors, until separated for further working. The entirely exhausted mass (*ressanzo*), consisting principally of kernels, is used for manure, and most probably exercises a very long continued influence, since the olive stones, being only incompletely crushed by the millstones, open up but extremely slowly in the dry soil. The olive stones also render good service as fuel, this application for them being generally preferred.

The produce of the olive tree fluctuates considerably both as to the quality and the quantity of the oil; even the variety of the tree has its influence. The wild tree, or that which has been allowed to return to a wild state, distinguished as *olivastro*, produces a small, oblong, very bitter fruit; its shoots are therefore improved by grafting when it is only two years old. The particularly large delicate olives of a variety distinguished by their long willow-like leaves, called in this country *punginaire*, are principally used for preserving. The ripest fruits yield the finest oil. In the Riviera district, between Nice and Ventimiglia, the full development of the olive can be peacefully awaited; but on the coast lying farther westwards the French are frequently compelled to commence the harvest prematurely, in order to prevent the olive being spoilt by the cold winds (*mistral*) of the latter part of the year. Upon the same ground, the olive trees there are supported by props, in order to produce a somewhat denser and better shelter of foliage. In the Riviera nothing of this is known, the tree being, on the whole, utterly neglected, and certainly it adds not a little to the beauty, or at least to the peculiarity of the tree, that it is left to attain a somewhat natural development. However, here it is not quite safe; on the coast frequently a large quantity of fruit is spoilt through being pierced by insects. The oil from the higher-lying districts is therefore of greater value, since such insects are not harboured there. The harvest extends from November to April. This spring, however, no olives are to be seen, last year having been in this respect one of those perfectly unsuccessful years which unfortunately almost alternate in equal numbers with the good harvests.

From old olive trees there sometimes exudes a substance (gum resin) which formerly, though probably only very seldom, was kept by druggists as "Gummi Oleæ," but up to the present has not been exactly examined. In 1816 Pelletier prepared from it a bitter crystalline substance, named by him "olivil," the composition of which, according to the analysis of Sobrero, of Turin (1843), agreed with the formula $C_{14}H_{18}O_5$.

Submitted to dry distillation olivil yields an oily liquid which would appear to present a certain similiarity to eugenol (caryophyllic acid), as met with in cloves. A more exact comparison of these two substances would be very interesting. In the Riviera this exudation from the olive tree is unknown. From the older literature it appears that formerly it was collected in Sardinia and South Italy, but this has not been done for a long time, so that it might now be very difficult to meet with this substance in sufficient quantity. Dioscorides mentions that the tears exuded from the Ethiopian wild olive tree were used as a medicine, and Pliny calls the olive resin occurring in Arabia, and used as a vulnerary, "*enhaemon*." In the pharmacy of the Middle Ages this product was called "elemi," a name since transferred to quite a different resinous substance. It scarcely requires to be mentioned that the olive tree of Ethiopia and Arabia was not the *Olea europæa*, so that the elemi of the earlier centuries may be as little referable to the gum resin of the olive tree as that of to-day. Still it is questionable what Pliny may have understood by Ethiopia, and it may be remembered that in the district north-west of the Red Sea the *Olea europæa* grows wild. As two noteworthy facts in the geography of plants, it may be mentioned that in the Middle Ages the olive culture was carried on for some time near Vevey, on the Lake of Geneva, but appears to have then been annihilated by the frosts, and, on the other hand, that olives occasionally reach maturity in exceptionally favourable situations near London. The leathery evergreen leaves of the olive attracted attention in the old pharmacy. The Leipzig *Apothekertaxe* for 1699, for instance, has "folia oleæ, Olivenbaumsblätter."

As to the beauty of the olive tree the opinions of Northerners are divided. One must wander and rest in the olive groves near Mentone, Monaco or Villafranca, in order to become acquainted with the charms that are peculiar to it. The venerable trunks, which have already bestowed food, fuel and valuable timber upon generations and generations, will have to be viewed in the diffused sunlight, with glimpses here and there of the sea. Just now its dull foliage stands in vivid contrast to the fresh grass which flourishes admirably in its slight shade. Between the broad leaves of the different species of oats and other grasses rises a profusion of the *Allium neapolitanum*, nearly allied to the *Allium ursinum*, but more elegant, vigorous, and scarcely giving off the odour of garlic from the parts above the soil. Associated with these are the colour-gems of the gorgeous *Anemone coronaria* and *A. hortensis*, the *Tulipa Clusiana*, *Gladiolus segetum*, and *Centranthus ruber*, the delicious perfume of *Cheiranthus Cheiri*, which disputes the precedence with the small profusely blossoming *Lobularia maritima*, Desv. (*Alyssum maritimum*, Lam.). Home memories are stirred by the *Anemone Hepatica*, *Bellis*, *Ajuga*, *Reseda lutea*, *Teucrium Chamædrys* and *Helleborus fœtidus*, to which the semi-shade of the olive groves is suitable. More pharmaceutico-chemical considerations arise when the edges of the terraces and banks shine with *Iris*, *Ruta bracteosa*, *Verbascum sinuatum*, *Anchusa italica*, *Rubia tinctorum*, *Euphorbia serrata*, or when *Hyoscyamus niger*, *Solanum miniatum*, *Ecballium Elaterium*, and *Mentha rotundifolia* show modestly in the background of manure and rubbish heaps. But sometimes a speedy end is made to these floral beauties and grassy carpets, the soil round the stems being dug up and loosened in order to prepare it to take up manure or to expose it to the action of the atmosphere. But grass and vegetables may be seen under the olive trees as permanent plantations.

Many trees in this district correspond perfectly to the striking picture of the Greek olive trees drawn by J. F. Julius Schmidt, the Director of the Observatory at Athens, in his *Contributions to the Physical Geography of Greece* (1861): "Wonderful is the appearance of the very old olive trees to be seen here. With their lower stems, sometimes burst asunder, sometimes opening like an archway, twisted spirally, then again fashioned pyramidally, covered with knots, with hemispherical and quite irregular stone-coloured excrescences, the lower part often resembling a large block of stone, from the crevices in which rises a freshly-foliaged thicket. Notwithstanding its wasted foundation, in which frequently tall shining green aroids and other plants lie hidden in spacious cavities of the trunk, protected from the vehement north wind, the aged tree supports a privileged existence. In its life and vigour it equals its younger neighbours and shows no signs of diminishing vitality." Very abundant information on the olive tree and its fruits is moreover to be found in the extremely exhaustive monograph: "L'Olivier," by A. Coutance, Paris, 1877.

The discovery of the original home of the more important cultivated plants has latterly awakened an enhanced interest, and botanists have not been deterred from the investigation of this question by its difficulty. The olive tree appears to have been originally limited to the south-eastern countries of the Mediterranean basin, and at a very early period to have spread westward. Professor Willkomm is of opinion that it occurred spontaneously in the countries all round the Mediterranean Sea and in its islands. He finds one support for this opinion, among others, in the certainly not strictly proved presumption that, for instance, in olden times entire forests of wild olive trees (*oleaster*) existed in Majorca. The same may be asserted of Sardinia and Corsica, though it appears with certainty, from Roman records, that the introduction of the olive into Corsica cost much labour. The countries extending from the Upper Indus to the Suleiman mountains possess, in the *Olea ferruginea*, Royle (*Olea cuspidata*, Wallich), a species very similar to the olive tree of the Mediterranean district. In the former, however, the thorns of the oleaster are wanting and the leaves are shining on the upper side and rust-coloured beneath. The fruit of this tree is smaller than the cultivated olive, but likewise rich in oil. Is the rusty-leaved olive tree the original form of the *Olea europœa* of to-day? With regard to the modern tendencies in these questions the possibility may be considered. The Garden of the Palazzo Orengo will yield, probably at a not very distant period, valuable data in this direction. The specimens of *Olea ferruginea* there are meanwhile still weak pot plants, the leaves of which present as yet no very decided character.

In the olive forests of the Riviera, which cover hills and valleys, a visible change is just now becoming manifest far and wide. The light green leaf-lobes are beginning to unfold on the grey, plump, fantastically intertangled branches of the fig trees; these, however, are only isolated, starting here and there sufficiently from masonry or rock to show through the grey green foliage of the olive groves without becoming a special feature. The fig forms so important a portion of the food of Italy that our chemical ignorance in respect to this valuable fruit is very astonishing. Whilst the olive has found an observer in the Neapolitan chemist, De Luca (1864), who has pointed out a connection between the mannite generally so abundant in the family of the Oleaceæ and the fat oil, we are lacking any knowledge of the chemical processes going on in the fig, or even trustworthy analyses of it. Before maturity the fig abounds in a disagreeably tasting milky juice and contains much starch; what eventually becomes of this? Is the sugar from the commencement only grape sugar, or is its subsequent exudation something more than a purely mechanical appearance? Is the sugar accompanied by much or little protein matter? Such questions have to be investigated in order to obtain a glimpse into the chemical consideration of this important food material.

Very usually the leaf-tufts of the squill or sea onion, *Urginea* or *Scilla maritima*, grow luxuriantly at the foot of the fig tree, where it is seen by the peasants with pleasure. When in the summer the blossoms of the squill appear on stalks a metre in height, the insects show a special predilection for them, and spare the ripening figs. This bulb is thus met with not only on the shore, but also in regions much further removed from the coast, as it grows also throughout the south of Spain and Portugal, in Sicily, the inland districts of Greece, Cyprus, and in the Balearic Islands, at an elevation of even 1,000 metres. Impossible as it is to cultivate this plant in the north, Charlemagne had the idea (A.D. 812) of transplanting the "*squilla*" to Germany, as well as the fig and the bay. We cannot accuse the German fathers of botany of inaccuracy when they occasionally, in the sixteenth century, gave the name "earth onion" to the scilla. In this country the entire bulb is usually out of the soil; it resembles the onion in form, with white, not red, scales, and occurs on the coast much more rarely than in the higher ground. By the sea is met with here and there an abundance of *Pancratium maritimum*, an amaryllidaceous plant, the bulb of which, considerably smaller than that of the *Urginea maritima*, appears to resemble it in chemical respects, and formerly was usually known as *Scilla minor*. This bulb grows at a considerable depth in the ground.

The distinguishing trees of this plant region bear evergreen stout leathery foliage; only a few other trees belong, with the fig, to the minority which cast their leaves every year. Thus there is the now miserable-looking pomegranate tree, with its slender young shoots, at first brown coloured, the thin naked ramifications of which do not produce a pleasant impression. Near it frequently stands the much more peculiar looking thorny jujube tree (*Zizyphus vulgaris*, Lamk.), the lanky branches of which, cracked here and there, at present show no leaves. Like the *Olea ferruginea*, and *Punica Granatum*, the *Zizyphus* is a native of Northern India, and yields there a very agreeable acid fruit, whilst the Italian jujube has a rather poor sweetish taste.

Still more in the summer time do the vine and the *Arundo Donax*, the latter being indispensable to the vine cultivator, contribute to the peculiar appearance of the landscape; at present both of them are only beginning to sprout, and they always take up far less space than the olive tree.

Here and there a dense crown of foliage, rising from powerful knotted stems, shines out in the midst of an olive grove, or alone on the sunny shore the tree spreads out its half-bared roots often over a surprising circuit. It is the St. John's bread tree, *Ceratonia Siliqua*. Certainly it is to be found nowhere else in Upper Italy or in the Central provinces, but in the south of the peninsula. However the Riviera di Ponente, especially the country round Monaco, has trees to show which equal those of the *piana* of Sorrento and Amalfi. This tree is decidedly, in Europe, less hardy than the olive, but it succeeds, on the other hand, in Central Africa, where the olive is not known. On the Ligurian coast, as well as in the south, it bears the historic name of "caruba," an Arabic designation recalling a people to whom Sicily at one time owed a period of prosperity, during which not only Islam but also trade and valuable economic plants were introduced into Spain and Southern Italy. The *Ceratonia* can only be reckoned an economic plant, however, to the extent that the pods are given to horses and mules. It appears remarkable that artificial cultivation has not yet succeeded in improving it so as to give a savoury fruit. Even the St. John's bread, from South Italy and Cyprus, is always a truly leathery dainty, and shares to some degree the very disagreeable smell and taste of the flowers and the young pods of the tree. In the ripe fruit this is owing to the presence of isobutyric acid. Would not an attempt to obtain a better product from this stately tree be remunerative?

The multiplication of so conspicuous an evergreen tree would also suit the landscape to a high degree, since in respect to its rich full green foliage, which may be compared to that of our oaks and apple-trees, it stands in striking contrast to the olive tree. The long rigid petiole, not unfrequently a foot in length, is provided with three to five, but most frequently with four pairs, of sessile leaflets, which are often nearly round, but mostly ovate. The breadth of the entire leaf at its base, *i.e.*, the length of the lowest pair of leaflets, frequently reaches seven inches, so that notwithstanding the leaves are only simply pinnate, the impression of a very complex ramification is produced. As it does not, like so many other pinnate leaves, bear a terminal leaflet, the enormous head of foliage assumes a rounded outline, which would appear to be somewhat too regular, did not the separate leaves by their variation in colour and shape exclude uniformity. The divisions of the leaf are not spread out flat, but incline somewhat towards one another, and on the under side are of a lighter though duller green than on the upper. The two surfaces also differ in their behaviour in other respects. The upper surface can easily become moistened with various liquids,—dilute alcohol, for instance; not so the under side. The leaf tissue is of very firm texture, but each separate leaflet is of more or less irregular, undulated outline, which even in a calm gives to the whole foliage a lively appearance.

Many other trees of the same division of the Cæsalpiniaceæ possess, in contrast to *Ceratonia,* doubly pinnate leaves. Indeed in examining the St. John's bread tree critically exceptions to the ordinary form of leaf are not unfrequently found, especially where one of the lowest leaflets is replaced by one consisting of two or four pairs of leaflets, usually not quite opposite, and often with a terminal one. Frequently the second leaflet of the lowest pair is also transformed. The variations from the ordinary leaf form are, however, never sufficiently numerous to influence the appearance of the tree. It presents, therefore, very great peculiarity quite apart from the flowers and fruit, which also have characters repeated in no other instance. On these accounts the genus *Ceratonia* was rightly set up for the sake of this tree only, and it has not since been enriched by a second species. This explains the remarkable fact that botanists have not found leisure to endow it with several names, and it is everywhere called by the name Linnæus gave to it. At present, in April, the tree shows neither blossom nor ripe fruit; only exceptionally are found isolated belated but still quite young crooked pods, which explain far better than the ripe ones why the Greeks named the tree *Ceratonia* (horn-fruit tree).

The *Nespole di Giappone*, the evergreen Japanese medlar tree, *Eriobotrya japonica*, Lindley (syn. *Mespilus japonica*, Thunberg) makes an appearance here and there, with its sweet scented flowers; it occurs scattered singly in the olive groves, especially in the neighbourhood of houses. Although by no means a tall tree, the *Eriobotrya* attracts the eye through its beautiful foliage, consisting of simple leaves, closely crowded together, the upper side of a shining dark green colour and the underside grey like the fruit. The name "Eriobotrya" alludes to the woolly appearance of the fruit, the Greek word Erion meaning wool. The rather stout leaf is very strongly developed, attaining a length of sixteen inches and a width of five inches; it is very slightly serrate and beautifully marked with a delicate network of veins. Not only is the yellow subacid fruit, which ripens in early summer, prized in the Riviera and the mountain villages, but the tree has also been plentifully cultivated for a longer time in South France (termed there *bibassier*) and India. Our earliest acquaintance with this fruit tree, indigenous to China and Japan, we owe to the German traveller, Engelbert Kämpfer, who has unmistakably described it under the name of "*bywa*," in his "Amœnitates exoticæ" (Lemgo, 1712, p. 800). It was subsequently cultivated in 1803 in the gardens of the Empress Josephine, at Malmaison, near Paris. It ripened its fruit probably first in Europe in the garden of Boccadifalco, near Palermo, in 1826, the Duke of Calabria having introduced there Eriobotrya in the beginning of the present century. It succeeds on the Lake of Como, and may even be seen in gardens at Biasca, south of the St. Gotthard. In Sicily it affords excellent fruit.

But especially the lemon trees occur in this Ligurian district in such large numbers that their light shining leaves stand out in most conspicuous contrast to the seriousness of the olive. The lemon tree is throughout the entire year favoured simultaneously with its red-tipped flowers and with fruit, but the principal harvest is obtained about the middle of May. The fruit requires more shelter than most of the other allied *agrumi*, as the entire genus is called, so that not even in the Riviera di Ponente is there a large quantity of lemons available for exportation. Indeed, the position of Nice is not mild enough, although an abundance of oranges are to be found there. The lemons are much more profitable, and the plant is therefore preferred everywhere in this country, where it can be tolerably well cultivated, that is chiefly between Monaco and San Remo. The greatest enemy of the lemon tree is the wind, which will sometimes strip the branches clean of leaves, through which the activity of the tree is frequently injured for a time. On the heights east of Mentone, close to the Italian frontier, where the south-west storms have freer access than in Mentone, the most beautiful lemons hang until they perish upon the naked boughs. It is remarkable how small a quantity of fallen fruit is met with in these lemon gardens, certainly far less than is usual in a northern orchard.

The lemons of the Riviera are the fruit known in Germany and France as citrons: they are more juicy and richer in citric acid than the true citron, although both fruits may have been developed from the same species. The Italian botanists separate entirely the lemon tree (*Citrus Limonum*, Risso) from the citron tree (*C. medica*, Risso), the *cédratier* of the French, and the fruits are so different as to serve quite different purposes. The lemon is used on account of the considerable amount of acid it contains and in the production of the essential oil; the usually much larger citron is used only in the preparation of candied peel: the lemon has so thin a rind as not to be suitable for the latter purpose. In the citron the white inner tissue of the rind is generally preponderant in weight, and so little juice is present, and that so slightly acid, that these true citrons cannot render the same service as lemons in the pharmacy and kitchen.

What may have been the Cedria poma, occurring about A.D. 1000, in the "Benedictiones ad menses" of Ekkehard, of the monastery of St. Gall, in Switzerland? Probably lemons; they are mentioned together with olives, figs, and pomegranates.

As an article of commerce the lemon is the most valued of all the *agrumi*, and is also probably the least perishable among these fruits. From the Riviera di Ponente they are sometimes carried off at good prices by ships from New York and Boston, and the absence of the Americans in any subsequent year leads to a very disagreeable disenchantment.

The sweet or China oranges are in this country cultivated only here and there. At Nice they predominate. Still more limited is the culture of the other *agrumi*, such as the bitter fruited orange (*Citrus vulgaris*, Risso), and the citron (*C. medica*, Risso). Savona has some repute on account of the *Chinotti*, the fruits of the bushy variety *Citrus Bigaradia sinensis*, which is cultivated on a somewhat large scale. The fruit is only eatable in a candied state; it is chiefly exported to France, where it is known as the "Chinois." There are other small-leaved varieties of Citrus which are not yet much cultivated in this country, as for instance the Mandarin (Citrus nobilis or C. madurensis?—see the classical work "Risso et Poiteau, Histoire et culture des Orangers," Paris, 1873), which has been introduced in Europe as recently as A.D. 1828; it is indigenous in southern China and the Malayan Peninsula.

Here and there, but only as a curiosity, one meets with the bergamot, a graft on the *C. vulgaris;* an insignificant pale yellow orange, with an aroma as fine as its taste is abominably bitter. This fruit appears to have been first produced in cultivation in the seventeenth century; its name derives from the bergamotta, a certain variety of pears, and stands in no relation whatever to the city of Bergamo, the environs of which are absolutely unsuitable for agrumi. The agreeable essential oil of bergamot was known in Germany at the end of that century, A.D. 1688, for instance, in a pharmacy in Giessen.

The so-called Adam's apple, which is in this country insipid and remarkable only for its size, is seen occasionally in the gardens, but hardly in memory of the crusaders who first brought information respecting this large fruit to Europe. In fact, it was mentioned at the commencement of the thirteenth century by Jacques de Vitry (Jacobus de Vitriaco), Bishop of Accon—the St. Jean d'Acre of the present day—in his "Historia Hierosolymitana;" and in 1582 the *poma Adami* appears to have been obtainable in German pharmacies, at least at Frankfort.

Thus, of the essential oils to be obtained from the *agrumi,* only the oil of lemon is made in the Riviera, and even that is prepared in but limited quantity, as the fruit itself finds a good market. At Mentone, however, there is a well-regulated and beautifully-situated establishment, belonging to M. Médecin, where two kinds of oil of lemon are prepared: the "essence de citron au zeste," and the "essence de citron distillée," the name oil of lemon being unknown in the trade. The former sort is obtained by rupturing the oil cells, which are situated in the outermost layer of the rind of all these fruits. For this purpose are used *écuelles à piquer,* which are saucers or shallow basins of pewter, supported upon a hollow stem and provided with numerous stout upright brass pins. Each *écuelle* is fastened by its stem into a depression in the table, and a workman rubs the lemons upon the upright pins, turning and pressing them so that the contents of the largest possible number of oil vessels may escape. This essential oil mixes with the watery juice from the neighbouring parenchyma cells, and collects in the hollow stem or tube, from which it is poured into a clarifying vessel. Here, after a short time, a layer of clear oil rises to the surface, which, after filtration, is at once sent to market. This oil, therefore, comes directly from the vessel in which it is formed in the very fruit, and is of much greater value than the other kind. Those oil cells that escape puncture in the *écuelle à piquer* are afterwards emptied by distillation. The rind is removed from the punctured lemons, and there is thus obtained a second quality oil, which is an instructive instance of the change that may be produced in an oil by distillation alone, as in their aroma the two kinds differ very much. The whole residue of the lemons is finally eaten with avidity by cattle, and appears to be a not unsatisfactory substitute for the fodder herbs of our meadows, which are absent from the South.

Eau de fleurs d'oranger (*aqua naphæ* of Pharmacy) is another leading article of the manufactory of M. Médicin, for which the flowers of the bitter fruited orange tree are chiefly used. In Nice, also, is distilled the oil of these flowers, the oil of neroli; it displays a fine reddish hue with a magnificent bluish fluorescence. This oil is never brought pure into commerce in consequence of its high price. The same oil is obtained in smaller quantity at Nervi, near Genoa.

The Riviera indeed presents only an imperfect view of the entire industry that is based upon the *agrumi;* probably its separate branches have always been limited to certain countries. Thus, oil of bergamot is manufactured only at Reggio, Messina, and near Palermo; oil of neroli only in South France. Other districts again are occupied in the preservation of the peel of citrons, oranges, mandarins, &c. The pharmaceutical world in the Riviera appears to be ignorant of these branches of industry. In a curious farmacia in Ventimiglia there was obtainable neither any information relative to them, nor a distillatory apparatus to be found. This establishment, however, is truly classical through the wonderful prospect over the Roia valley, the lofty Maritime Alps and the sea. The shop, vessels, and a portion of their paltry contents, originated in the earlier decades of the last century, and probably also some of the dust and dirt.

Let the eye rove over those olive groves that border the coast, the animated hill-slopes, and the valleys filled with pleasant shadows. The question rises, What might have been the appearance of this land at a time when the olive was not yet introduced, when the *agrumi* did not ripen here their odoriferous fruit, and even the fig and the vine were absent? Covered with coniferous trees and evergreens, probably mountain and valley looked no less charming. But what would the future of the people of the Riviera be should the olive commerce be menaced with a more strenuous competition? At the present time the revenue laboriously wrung from the olive tree remunerates the small cultivator but very moderately. The only advantage possessed by olive oil over other fat oils is in its fine flavour; for other purposes than as food it can be replaced by other fats, so that a considerable portion of the "olive oil" exported from Italy even consists principally of cotton seed oil which has been pressed in Marseilles. Were olive oil, either in this underhand way or more openly, gradually excluded from the world's market, what reaction would it produce upon the Riviera? To what plant would the sober olive give place?

One tree of the future, at least—one of hope for some of the poorly wooded districts of Italy,—may to a certain extent perhaps be recognised in the *Eucalyptus globulus*, Labill. This tree is sufficiently heterogeneous to give, in the event of its extensive cultivation, an entirely altered appearance to the landscape. For this, however, the Riviera has yet a long time to wait; for of systematic forest cultivation of the eucalyptus nothing is yet known, and scarcely anything of the cultivation of forestry itself. But there is sufficient opportunity of seeing already fine specimens of this tree everywhere, from Genoa to Cannes. Many entire lengths of road are planted with it, and in very many gardens these Australian citizens already tower boldly above their surroundings, and warrant the expectation that in this country they will not remain far below the height of 100 metres that they attain in Tasmania. The tree was discovered in the south of that island on the 6th of May, 1792, in the neighbourhood of the Entrecasteaux Channel, by Jacques Jules Labillardière, when botanist to an expedition, consisting of the *Recherche* and the *Espérance*, fitted out by order of the French National Assembly to search for La Pérouse, who had disappeared since 1788. Even a less learned collector might well have been attracted by this striking gigantic tree. In the first place, the entirely different appearance of the full-grown tree is remarkable. In the young tree the quadrangular branches are furnished with broad opposite amplexicaul leaves; but instead of these, while still quite in its early years, on the new shoots, and afterwards on all the subsequent ones, there are formed small long-stalked pointed leaves, which often take a sickle-like form. The latter form alone is shown by Labillardière in his great work, together with the fruit, which he compared to the fashionable button of the day, and on that account he named the new species *Eucalyptus globulus.* The broad ovate leaves and the young shoots are covered with wax, imparting to the quite young trees a dull grey green colour, which is not so much the case with the small later leaves. These hang loosely downwards from the long rather horizontal branches, and are swayed by the wind like aspen leaves, notwithstanding their thick coriaceous texture. It is known that the chemical properties of a leaf hanging perpendicularly differ from those of a leaf occurring in the ordinary nearly horizontal direction. Robert Brown noticed, for instance, that in respect to the stomata in the eucalyptus leaves an important difference exists. The broad sessile leaves have stomata only on the under side; but the pendent stalked leaves are provided with them on both sides. The action of the sun's rays upon the two kinds of leaf must likewise be very different. Most probably even the oils occurring in the two leaf-forms do not correspond.

The trunk of the *E. globulus* (and other species) throws off very long strips of brown bark in a similar manner as the plane scales off its shorter but much wider pieces of bark. The entire family of *Myrtaceæ* is distinguished by its richness in essential oils, and the genus *Eucalyptus,* which belongs to it, is not an exception. When a leaf is held against the light, numberless oil glands can be seen; even the bark torn off by the wind, from

Eucalyptus siderophloia, Benth., and other species, is still aromatic—that collected in Australia far more so than that of this country. This essential oil has procured for the tree a considerable reputation during the short period of its naturalisation in Italy, South France, Algeria, Spain, and Portugal. In pharmaceutical literature it has been a standing subject since about 1866, and it has become not less important in the horticulture of the South.

With respect to the essential oil no definite conclusion has yet been arrived at. It appears probable that it is essentially a mixture of cymene or cymol, $C_{10}H_{14}$, and terebene, $C_{10}H_{16}$, with an oxygenated oil, $C_{10}H_{14}O$; that is to say, these constituents were recognised in commercial eucalyptus oil, which was probably distilled in Australia from *E. amygdalina,* Labill. Ferdinand von Müller, the distinguished botanist of the colony of Victoria, enumerated about sixty species of *Eucalyptus* in his "Fragmenta Phytographiæ Australiæ," 1860-1861, whilst Bentham, in his "Flora Australiensis," vol. iii. (1866), 185–261, described not less than 135 species of Eucalyptus. A glance at the names alone would awaken the expectation of considerable chemical variations. Amongst them are found such designations as *citriodora, elæophora, melliodora, mellissiodora, odorata, oleosa, piperita.* This fact allows the conclusion that there are important differences in the smell of the oil of the aromatic leaves, and that, nearly as the species may stand in botanical relation to each other, they still produce chemically different oils. Moreover, judging by the odour, the *E. globulus* contains in the large and numerous oil cells of its fruit a different oil from that in its leaves and bark. In the garden of the Palazzo Orengo, besides some fine specimens of *E. globulus,* there are some very young trees of *E. eugenioides,* Sieb. (referred by Müller to *E. hæmostoma,* Smith, by Bentham to *E. piperita,* Sm.), the leaves of which upon being rubbed give off a very remarkable smell of butyric acid, exactly resembling St. John's bread. The work upon the only kind of eucalyptus oil at present examined is not yet finished, and of the oils of the other species we have no knowledge at all, so that these trees still present an immense field for chemical research.

Whether the final judgment of medicine upon the eucalyptus leaf be favourable or unfavourable, gardeners and foresters are no doubt perfectly right in advocating the propagation of this tree in the South. Febrifuge in itself or not, its greater diffusion will naturally make the district healthier by intercepting the scorching sun rays and contributing to the more active distribution of atmospheric moisture. Such expectations will be doubtless quickly fulfilled where regular woods of eucalyptus are succeeding now, as in Algeria, the Campagna di Roma, and the Delta of the Var, near Nice. For these inestimable services eucalyptus trees are pre-eminently suited by their remarkably rapid growth. Throughout the Riviera the *E. globulus* alone has been more abundantly planted. Next to *E. amygdalina* this species attains the greatest height, and it probably owes its more frequent cultivation in Europe to its having been the first introduced. But it is a question whether other species also, both the shrubby and tree forms, *E. robusta* in the first line, would not be equally well adapted to the South European climate. In the gardens of South France, the *E. globulus* occurred as a curiosity as early as 1822, and in Algeria in 1854; but real cultural experiments were not undertaken till 1863. At present a tree, fifteen years old, about 28 metres high, with numerous enormous branches, stands in Monsieur Thuret's garden at Antibes, and at a man's height is 2·25 metres in circumference. Another, in Mr. Hanbury's garden, close to the Palazzo Orengo, only seven years old, has a circumference of 1·30 metre, and is 19 metres high. This is a development which is not attained by any other indigenous or introduced tree in Southern Europe. The olive, chestnut, walnut, and ceratonia grow much more slowly, and do not present so tall, straight, and columnar a trunk. Labillardière called attention to the extraordinary hardness of the wood. It is evident how valuable such a tree would be in this woodless land; but in the Riviera the reign of indolence is not yet broken by the eucalyptus; it must, however, be granted that it seems to be of doubtful success in several localities, as, for instance, in Mortola. In Algeria, Corsica, and the Roman Campagna, on the other hand, very promising and extensive plantations appear to be in full development. Separately and in small groups the *E. globulus* is sufficiently frequent in the Riviera di Ponente to compel closer consideration. As to whether it is to be described as a beautiful tree, opinions are much divided, and on account of its peculiarity it is difficult to form a definite judgment in the matter, because at different stages of its growth it changes far more in respect to its branching and foliage than any European tree. When it bears uniformly the sickle-formed leaves, their great mobility introduces a very pleasant liveliness among the surrounding stiff-leaved olive, ceratonia, and lemon trees. However, the foliage of the eucalyptus cannot on the whole be called particularly rich; in this respect, and also as to the pendent leaves, it might be compared to the birch. But this tree is much more branched, and fine specimens therefore make a far more striking impression than the eucalypti.

What the effect as to appearance in the Riviera will be at some future time of a tall straight-stemmed wood of *E. globulus*, the foliage of which would probably not amount to full development before the trees attained a height of thirty metres, must remain undecided. However, it can scarcely be expected that trees 100 metres high, a height to which this species attains in Tasmania, will afford a really beautiful prospect. The species which grows to the greatest height, *E. amygdalina*—the stems of which, 145 metres high, exceed that of the tower of Strassburg Cathedral (142 metres), or the present height of the Cheops Pyramid (137 metres)—appears not to be yet cultivated in Europe; but probably some of the smaller partially bushy species might become rivals to *E. globulus* as to appearance. Obviously, the climate of the Riviera, and the still more favourably situated district of central and southern Italy, not too far removed from the coast, suits the *E. globulus* as well as that of Algeria, Andalusia, or Portugal. It prospers also near the north Italian lakes; on the other hand, its success in Lombardy, Istria, and in South France westward of Cannes is as yet doubtful; neither has Pisa proved favourable. Possibly species might be found that would not seriously suffer from the mild winter of southern England. As regards this and other questions, the able paper of Professor J. E. Planchon's ("Revue des Deux Mondes," Janvier, 1875) may be pointed out as a valuable source of further information on Eucalyptus.

The juices of several eucalyptus trees correspond with the commercial kino from the Indian tree, *Pterocarpus Marsupium*, Roxb., especially those of *E. citriodora*, Hook., *E. corymbosa*, Sm., *E. rostrata*, Schlecht., and *E. resinifera*, Sm. The last-named is represented by some young trees in the grounds of the Palazzo Orengo, which have lately much suffered from storms. It can only be hoped, therefore, that in the near future the vigorous group of the eucalypti may produce a picturesque alteration in the olive groves of the Riviera. In the public grounds a similar part has hitherto been played by the handsome *Schinus Molle*, L., of the family Anacardiaceæ. But this small South American tree, with its somewhat pungent red berries—known on that account in Italy as the Pepè, "pepper tree"—is much less vigorous than the eucalypti, and up to the present time no special interest has attached to the *Schinus*.

The date palm also, *Phœnix dactylifera*, L., occupies in the landscape of this district a prominent place, and produces illusions that could not emanate from the Australian tree, which has no history. Indeed, the palm form has a much more remarkable appearance, especially to the Northerner. To Europe belongs only the dwarf palm, *Chamærops humilis*, L., a very ordinary ornament in our plant houses, growing abundantly near Gibraltar and throughout Sicily, not in Liguria. But the date palm is a much more imposing representative of this family, and is most generally the tree meant when palms are spoken of. Involuntarily upon the bare mention of the word "palm," there is associated with it pictures of oriental peculiarities in nature, history, and customs, with a fulness dependent upon the extent of knowlege and depth of the imagination of the thinker; whilst the history of the eucalyptus, begun under our eyes, carries us indeed farther away to the Antipodes, but not into the cradle-lands of the oldest civilisation, where the palm is particularly at home. Here in the Riviera the palm tops are sufficiently frequent to favour such lovely impressions. Already the form of the stem, with the remarkable traces of numerous preliminary rosettes of leaves, is thoroughly different in appearance from the trees of Central Europe, and still more so the stately top of the palm, with its wide-spreading tufts of leaves. Whilst the gentlest breath of wind sways the loosely-hanging sickle-shaped leaves of the eucalyptus, the great palm fronds remain in undisturbed peace until startled by a much rougher shock, and even the storm only seldom overcomes the strong woody petioles. Many trunks deviate in different ways from the exact perpendicular, and such deviation occurs especially in groups of palms up which the ivy and smilax have climbed. Bunches of fruit also, shining with nearly ripe berries, give at least an indication of the blessings which the date palm confers upon its native country, although its fruit in this country cannot compete either in size or flavour with the Algerian and Egyptian fruit.

Five degrees further south, at a short distance from the Spanish coast, in the province of Alicante, is Elché, famed for its palms. The date woods there number about 100,000 trees, yielding a considerable quantity of palatable fruit, a result that has not yet been attained in the Riviera. But, except Elché, this is the only district in Europe where palms can be seen in such numbers as to warrant the designation palm groves. This is limited, however, to Bordighera and San Remo, as even the vigorous palms of Nice only form a boundary, certainly a very picturesque one, to the Paglione, which, when it has any water, flows through the town. Throughout the whole of the Riviera di Ponente the gardens are adorned with isolated palms, making altogether a very large number, of which many are a foot in diameter, and exceed ten to twenty metres in height; but they occur in thousands only in Bordighera. They are used here, as also in Elché, in the ceremonies of the Catholic Church at Easter time, especially on Palm Sunday. The preparation and forwarding of palm leaves for this purpose form, in Bordighera and San Remo, a very remunerative occupation, as there is, in spring, a similar requirement for the Jewish services. Well-informed persons estimate the palm trees in Bordighera at 10,000, and

Figured in Good Words. pl

this number is continually increased by the planting of Egyptian seeds, but in some well-sheltered places at Bordighera dates become perfectly ripe and germinate. In the garden of Signor Moreno seedlings spontaneously growing from fruits dropped from the palms may be observed. Many of the trees are wretchedly maltreated, the elegant out-spreading tufts of fronds being in summer time bound together with hazel shoots, so that the formation of chlorophyll in the innermost fronds is stayed. These more delicate and paler fronds, prepared "*alla romana*" as a symbol of purity, are at Easter time in great demand for exportation, and valued doubly as high as the ordinary ones. The fronds required for the Hebrew religious ceremonies are to be treated somewhat differently ("*alla ebrea*"); they are shorter, and provided with a smaller number of leaflets. Of less importance is the plaiting of beautiful small mats and hats from the split palm leaves.

Although the planting of the palm in Italy dates from ancient times, its more general distribution through Sicily, Southern Italy, Southern Spain and Sardinia was the work of the Arabs. Whether the trees of the Riviera are to be referred back to those times remains undecided. The fanciful inhabitants of this district, justly proud of their Paradise, appear to be of this opinion, and reckon the age of their largest date palms by centuries, if not at a thousand years and more. But it appears that, in general, the *Phœnix dactylifera* does not attain any great age, and if the opinion be taken of unprejudiced observers of mature age as to the age of date palms sown by themselves, the conclusion will be arrived at that only a few of the trees could have seen the preceding century. Palms seem, however, to have long ago been used for ecclesiastical purposes in San Remo, since Pope Sixtus V., in the year 1584, is stated to have bestowed on Captain Bresca, of San Remo, the important privilege exclusively to provide the palm leaves required for the *casa apostolica* every Easter. The particulars may be found in the charming idyl of Ruffini's "Doctor Antonio," which every visitor of the Riviera must necessarily read for completing his impressions. The privilege alluded to still belongs to a family of that name.

The charming tract of land extending from Bordighera to San Remo used, in the past century, to be termed the "giurisdizione delle palme."

At the points of the Riviera where most frequently the foreign traveller stays longest the *Eucalyptus globulus* and *Phœnix dactylifera* are at present sufficiently numerous to be considered well-settled and indeed very prominent members of the flora. They are indications of the meteorological conditions of this strip of coast, which render possible the success of a flora, that is only again to be found several degrees farther south. These two trees proclaim, more clearly than all the thermometer observations in the land, the true south, where wintry nights in May no longer pinch the promising shoots. Formidable drought and scarcity and violent storms are, however, enemies to be reckoned with here, and sometimes cause very perceptible damage. The scarcity of water is confined within certain limits by the industry of the cultivators, and even storms do not penetrate everywhere. At any rate these evils do not so much determine the character of the vegetation as regularly recurring spring frosts.

The gardens of this country also contain many noteworthy plants which have no claims to be indigenous to the Riviera. In this respect the public pleasure grounds and botanical gardens of Pisa, Genoa, and Nice are worth notice. The garden at Pisa is one of the earliest university gardens (that of the "Serenissima Signoria" of Venice, at Padua, being established A.D. 1545), probably laid out, about 1547, by Luca Ghini, *lector simplicium,* that is, professor of materia medica in the university there, who also first founded a herbarium. The garden of Pisa is at the present time in exemplary condition, and does credit to its director, Caruel, one of the most distinguished among Italian botanists. The camphor tree and the *Gingko biloba,* L. (*Salisburia adiantifolia,* Sm.) of that garden can hardly be equalled elsewhere in Europe. The university garden at Genoa is remarkable on account of its highly picturesque situation and its degeneracy, but it has still some old interesting trees to speak of better times. The newer public gardens of Genoa, Monaco, Monte Carlo, and Nice show what considerable effects can be there obtained by the intelligent grouping of exotic plant forms, for which the climate is suited, with selected indigenous ones. The *Acqua Sola*, of Genoa, displays the elegant *Acacia Julibrissin*, Willd. (*Albizzia*, Durazzo), which is well suited to give an idea of the great beauty of the somewhat allied tropical tamarind tree. In the grounds at Nice palms grow most charmingly with the oleander, eucalyptus, agave, and araucaria, and similarly at Monte Carlo, Monaco.

Still further west, at Antibes, a prominent French botanist, Thuret, and his not less distinguished friend, Bornet, laid out, in 1857, a true botanic garden which has been kept in unsurpassed cultivation until the present time, and even now, after Thuret's death (1875), and Bornet's departure, presents an incomparable collection of living trees and shrubs. Here stands, as before mentioned, the oldest eucalyptus in Europe, surrounded by a group of magnificent conifers, in the midst of green turf bright with many-coloured anemones.

The garden of the Marchese Pallavicini, at Pegli is known in a much wider circle; a visit to it from Genoa is an obligation of the regular tourist, and usually yields considerable pleasure, notwithstanding that in it a taste for natural beauty reigns less supreme than showy magnificence and lavish expenditure, and of scientific judgment there is none. The charm of the landscape is, however, not injured thereby. The pines spread nevertheless their crowns over the dark green cherry-laurel bushes. *Cinnamomum Camphora*, a magnificent specimen of which is met with here, is not surprising, considering the by no means tropical climate of its native land; the Isola bella, in the Lago Maggiore, has in its gardens quite as handsome an example, and others are to be found in the gardens round Naples, as at Capodimonte. Evidently the camphor tree must have been introduced into Italy as early as the commencement of the present century, if not before. It succeeds everywhere very well, and has a much better appearance than many among the more closely allied Lauraceæ, its less rigid leaves being really mobile on their long petioles; when rubbed they give off a decided smell of camphor.